GEOGRAPHIC SCHOOL BULLETINS

Published Weekly by

THE NATIONAL GEOGRAPHIC SOCIETY

(The National Geographic Society is a scientific and educational Society, wholly altruistic, incorporated as a non-commercial institution for the increase of geographic knowledge and its popular diffusion. General Headquarters, Washington, D. C.)

Contents for Week of November 17, 1941. Vol. XX. No. 19.

1. Gateways to Russia for U. S. Aid
2. Ruins Dot Great Exuma Island, New U. S. Base in Bahamas
3. The Kurds of the Restless Bible Lands
4. World's Largest Steel Industry Supplies U. S.
5. "Swamp's Afire!" Is the Cry in Great Dismal

© *Stanley Toogood*

THIS BAHAMA HITCHHIKER'S SPEED IS A TURTLE'S PACE

As early as 1671 the settlers in the Bahamas realized that turtles were a source of food, and took legal measures to protect them from wasteful fishing. Now the green turtle and the loggerhead turtle are caught and penned up for fattening before being converted into soup. They may weigh from 500 to 750 pounds. The loggerhead turtle (above), not so delicate a food as the green turtle, grows so large that youngsters climb on its back for a ride in the fattening pen. Catching the hawksbill turtle for tortoise shell is another of the fishing industries of the islands where a United States base is being built (Bulletin No. 2).

HOW TEACHERS MAY OBTAIN THE BULLETINS

The Geographic School Bulletins are published weekly throughout the school year (thirty issues) and will be mailed to teachers in the United States and its possessions for one year upon receipt of 25 cents (stamps or money order); in Canada, 50 cents. Entered as second-class matter, Jan. 27, 1922, Post Office, Washington, D. C., under act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of Oct. 3, 1917, authorized Feb. 9, 1922. Copyright, 1941, by National Geographic Society, Washington, D. C: International copyright secured. All rights reserved. Quedan reservados todos los derechos.

GEOGRAPHIC SCHOOL BULLETIN

Published Weekly by

THE NATIONAL GEOGRAPHIC SOCIETY

(Founded in 1888 for the Increase and Diffusion of Geographic Knowledge)

General Headquarters, Washington, D. C.

Gateways to Russia for U. S. Aid

ARCHANGEL, RUSSIAN GOAL OF U. S. ATLANTIC SHIPPING

ARCHANGEL, Russia's northern base to which American-made supplies will be shipped from Boston, is nearly 5,000 miles from the New England seaport, even when the trip is made by direct, peacetime routes. The harbor, usually frozen over from late October until June, can be kept open at such times only by the use of icebreakers.

The city sprawls along the banks of the North Dvina River where its waters flow into the White Sea near the Arctic Circle. From the port a railroad runs the 700 miles to Moscow. This line roughly parallels the 1,200-mile Murmansk-Moscow railroad for several hundred miles. The shorter, more direct line from Archangel runs through terrain that has fewer obstructions and marshes than the Murmansk route, an advantage especially important at the time of spring thaws.

Archangel was founded as the result of the shipwreck of an English trading captain, the only survivor of an expedition sent out in 1553 to seek a northeast passage to the Orient. After finding refuge in the old monastery of St. Michael the Archangel, whose domes and cupolas then were the only sign of life along the thickly wooded White Sea shores, Captain Chancellor set out to Moscow. There, with Tsar Ivan the Terrible, he made arrangements for trade between England and Russia which led to the building in 1584 of Archangel's first shipping facilities.

In the 17th century, the port was important in traffic with Western Europe. After the rise of the more convenient Russian port of St. Petersburg (now Leningrad) on the Baltic, however, Archangel declined in importance. Not until the railroad was laid to Moscow in 1898 did the port regain prominence.

When Russia was fighting in the 1914-18 World War, Archangel was a strategic supply base. In the turbulent days of Russian civil war and Allied intervention, it was the northern base for British, United States, and French troops.

Under the Soviet regime many new sawmills were built. Other factories began turning out such products as rope, paper, bricks, alcohol, soap, cellulose, and various wooden and leather articles. Archangel normally operates shipbuilding yards and extensive fisheries. Its large harbor can accommodate hundreds of ocean-going vessels (illustration, next page). Through the port passes some four-fifths of the entire White Sea trade. When the Germans invaded Russia in June, 1941, Archangel's inhabitants numbered more than 281,000, compared with only 77,000 in 1926.

SUPPLIES FROM U. S. VIA VLADIVOSTOK HALF ENCIRCLE GLOBE

VLADIVOSTOK, Soviet Pacific port and eastern terminus of the Trans-Siberian railroad, more than doubled in size during the first World War, and is experiencing again the frenzied handling of war supplies. This city of about 200,000 persons receives the materials shipped from the United States by way of the Pacific.

During the first year of the World War, imports reaching Vladivostok were about ten times the amount received the previous year. Supplies shipped then from the United States alone were valued at $55,000,000.

Vladivostok is about 5,250 miles from San Francisco, and fast steamships normally would require some 20 days to make the trip. From the Siberian port,

UMI

Photograph by A. Aubrey Bodine

RED-HOT HEART OF THE STEEL INDUSTRY IS THE BLAST FURNACE, WITH ITS TRIO OF ROUND-TOPPED STOVES

A super-hot furnace without a flame (heated to 2,200 degrees Fahrenheit by blasts of scorching air), the blast furnace prepares iron ore to become steel, by melting it with coke and flux (which is a mixture of limestone and dolomite). A typical blast furnace unit (center) consists of the furnace itself, topped by pipes and conveyers of the "skip hoist" for feeding it with raw materials, and three circular stoves (to the left), which heat air to be blown into the furnace under pressure as the "blast." From 2 tons of ore, 1 ton of coke, 4 tons of air, and ½ ton of flux, the furnace produces 1 ton of molten iron, ready for steel processing. Another blast furnace unit appears through the smoke to the left of the central one, and a third is partially visible on the right. Steel from this plant at Sparrows Point, Maryland, went into San Francisco's Golden Gate Bridge (Bulletin No. 4).

GEOGRAPHIC SCHOOL BULLETIN

Published Weekly by

THE NATIONAL GEOGRAPHIC SOCIETY

(Founded in 1888 for the Increase and Diffusion of Geographic Knowledge)
General Headquarters, Washington, D. C.

Ruins Dot Great Exuma Island, New U. S. Base in Bahamas

(This is the twelfth of a series on the new U. S. defense bases.)

GREAT Exuma Island in the Bahamas, which was settled largely by pro-English refugees from the southern Colonies at the end of the American Revolution, is receiving another influx of Americans. The early settlers were anti-U. S. planters chiefly from South Carolina, Georgia, and Florida. The newcomers are technicians beginning defense work on the site for the new United States base.

Great Exuma is one of more than 3,000 islands, cays, and reefs comprising Britain's colony of the Bahamas. Only about a score of the islands are inhabited. Since August, 1940, the governor has been H.R.H. the Duke of Windsor.

Harbor at Georgetown, Its Chief Port

The new defense stronghold will be about an hour's flight north of the great United States base at Guantanamo Bay, Cuba. It is a little farther southeastward from Miami, Florida.

The spot on which it will mushroom to noisy activity is one of those pleasant, sleepy islands between the Atlantic and the Caribbean, whose long-past days of greatness are treasured in local memory. Lush tropical vegetation hides the crumbling ruins of plantation homes, wooden locks still make fast old church doors, and cemetery fences bear the original hand-tooled hardwood scrollwork. As late as 1873 Great Exuma was covered with plantations, most of which now are either abandoned entirely or cultivated only in part.

Spreading 40 miles long and only one to two miles wide, the palm-lined island rises little above sea level except for a range of low knolls in the north. But it has many sheltered bays. Georgetown, the chief port, is one of the best harbors in the Bahamas, thanks to its broad bay and the shelter afforded it by five-mile-long Stocking Island. At one time Georgetown was advocated for the capital of the Bahamas, but lost out to Nassau, 130 miles to the northwest on New Providence.

Most of the 4,000 people on Great Exuma are Negroes, descendants in many instances of freed slaves. In some of their homes are treasured fine cut glass, early cabinet work, and bric-a-brac left with the land itself to the colored folk.

Cotton Fields Abandoned

Little Exuma, about one-fourth the length of Great Exuma, lies across a narrow channel from the larger island, with which it is connected by a primitive ferry service. Its scant population supports only two villages of any size, Forbes Hill and The Pond, named for natural features which stand out prominently on the narrow, flat island.

To the north of the Exumas stretches a 100-mile string of stepping-stone islets reaching nearly to the Bahamas' capital, Nassau. There coral rocks, low atolls with beaches of white sand, and long reefs white with spray offer, in rapid succession, a panorama of all the varieties of coral islands. Among the larger ones are Highborne Cay and Great Guana Cay.

In a favored region for small-boat cruising among the myriad neighbor islands, Great and Little Exuma islands have been described as "sea comets with tails of brilliant cays."

The old cotton and sisal plantations on Great Exuma were abandoned because of competition from more favored regions; many of the early settlers emigrated

UMI

transportation of freight across the Trans-Siberian Railroad to the battlefront in Russia usually takes at least 10 days, if the supplies are shipped at express speed.

The distance from Vladivostok to the western border of the U.S.S.R. is about 6,000 miles, so that supplies for the present Soviet front would have to travel about 11,250 miles from San Francisco. Supplies from the United States accordingly go approximately halfway around the world, requiring a month and more in transit.

Shipping to Vladivostok must pass through straits formed by islands of the Japanese Empire, the shorter routes being through La Perouse or Tsugaru straits.

Vladivostok's harbor freezes over toward the end of December, and the ice does not disappear until the middle of April. During most of this period ships enter and leave the harbor in the wake of icebreakers.

Note: The National Geographic Society's Map of Europe and the Near East provides a basis for study of the U.S.S.R.'s port of Archangel and its neighbors. The Map of the Pacific shows Vladivostok in relation to Pacific nations. Price lists for these and other maps published by the Society may be obtained from the headquarters in Washington, D. C.

See the *National Geographic Magazine* article, "Russia of the Hour," November, 1926.

"Forts for Vladivostok Crown Siberia-Manchukuo Border Hills" appeared in the April 17, 1939, issue of the GEOGRAPHIC SCHOOL BULLETINS.

Bulletin No. 1, November 17, 1941.

Photograph by Graham Romeyn Taylor

ARCHANGEL'S INTENSE COLD HAS CHILLED U. S. TROOPS

Resting in the sunshine with bare arms is comfortable for a few minutes, but the cold weather at this White Sea port keeps women bundled up in sweaters, scarves, and clumsy but warm felt boots, even for such strenuous work as coaling a ship. Though Archangel is in the same latitude as Iceland, just south of the Arctic Circle, it has no warm Gulf Stream to temper its frigid cold. American soldiers had a taste of this weather when the port was their northern base of operations during Russia's civil war; other troops were based at Vladivostok.

GEOGRAPHIC SCHOOL BULLETIN

Published Weekly by

THE NATIONAL GEOGRAPHIC SOCIETY

(Founded in 1888 for the Increase and Diffusion of Geographic Knowledge)

General Headquarters, Washington, D. C.

The Kurds of the Restless Bible Lands

THE recent uprising of Kurdish tribes in Iran reminded the outside world that current history of the Near East is affecting peoples and places that survived events recorded in the Bible. The remote mountain regions of Kurdistan hold but one of the turbulent, little-understood tribal groups that bring modern unrest to the ancient Bible Lands.

Kurdistan is one of the world's most picturesque regions, wild and tumbled, with rich, fertile valleys and snow-capped mountain peaks reaching heights of more than 10,000 feet. Its boundaries are somewhat indefinite, cutting across the corners of northwest Iran (Persia), northeast Iraq, and southeast Turkey, also touching southernmost Russia. Its name means "Country of the Kurds," who are a fierce people, with a reputation for deep attachment to their homes, and a long history of struggle for independence.

From Noah's Mountain to Zoroaster's Birthplace

Its northern border is sometimes set at Mount Ararat, in Turkey, the traditional resting spot of Noah's Ark. The portion of Kurdistan in Iran includes Lake Urmia, near which is the reputed birthplace of Zoroaster, founder and prophet of Persia's ancient Zoroastrian religion. In Iraq the land of the Kurds stretches southward to take in the old Assyrian town of Erbil (Arbela), which has maintained its original location for more than four thousand years.

Some Kurdish tribes spend their summers in the high mountainous regions of Iran, then lead their herds down into the warmer lowlands of Iraq for the winter.

The Kurdish tribes throughout the Bible Lands are still chiefly nomadic, living in black tents which they pitch wherever grazing is good for their cattle, goats, and horses. Where families of Kurds live in more permanent settlements in the valleys (illustration, next page), they cultivate wheat, barley, and corn, and supplement their grains with the products of orchards, vineyards, and vegetable gardens. One unusual vegetable of the Kurds is known as manna, or the "Divine Sweet Meat."

The early origin of the Kurds is attested by Sumerian records which indicate that a related people were in power along the Tigris more than twenty centuries before Christ. Kurdish tribes battled the ancient Sumerian, Hittite, and Assyrian rulers. Back in the 6th century B.C., according to the Greek historian Herodotus and early Persian folklore and epic poems, these people were described as living much as they do now.

Sultan Saladin Was a Kurd

Although Arabs, Mongols, and Turks in turn invaded the settlements of various independent Kurdish tribes, often wiping out their homes and killing off large numbers of people, the conquests were seldom easy or complete. At Erbil, in 1257 A.D., some 20,000 invading Mongols were destroyed by the victorious Kurds.

Saladin, storied Sultan of Egypt and Syria, and fierce fighter against the Crusaders in the 12th century, was a Kurd. It was during his reign that the Kurds attained their greatest expansion.

In the Persian Empire, the Kurds enjoyed special privileges in return for acting as the protectors of the sacred temples of Zoroaster.

Kurdish tribes contributed considerable manpower to Turkish ranks on Middle East fronts during the World War.

UMI

elsewhere. In the fertile spots today, the natives grow vegetables and fruits. There is also a little fishing for sponges, turtles (illustration, cover), and pearls. Stock raising is more profitable: sheep, pigs, goats, and turkeys thrive.

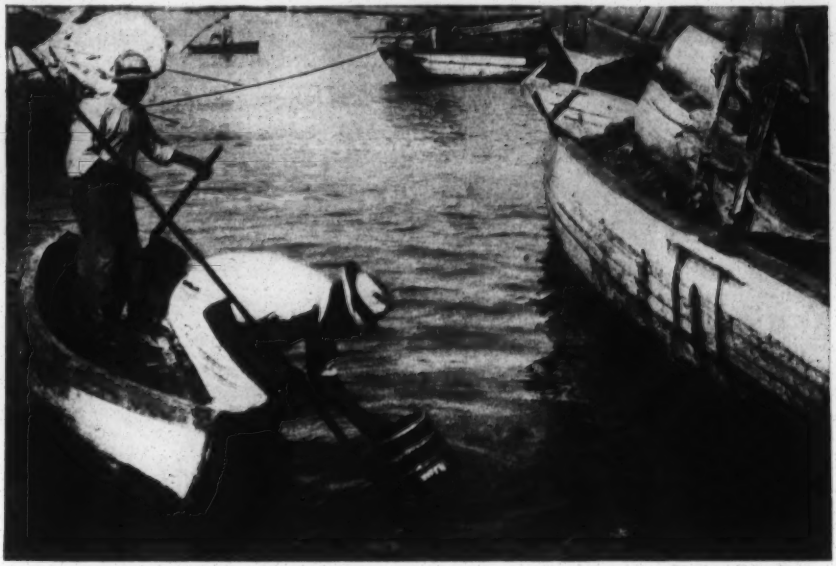
At opposite ends of Great Exuma are Rolleville and Rolletown, named after the family of Lord Rolle, one of the early plantation owners who left his estates by deed to his slaves and their descendants when the Abolition Act set them free.

Note: The introduction to the new map of the Atlantic Ocean in the September, 1941, *National Geographic Magazine* discusses island bases being built for the United States. A price list for the map itself and other maps published by the National Geographic Society may be obtained from the Society's headquarters, 16th and M Streets, Washington, D. C.

See also these articles in the *National Geographic Magazine* on the Bahamas: "Coral Castle Builders of the Tropic Seas," June, 1934; and "Bahama Holiday," February, 1936.

Some GEOGRAPHIC SCHOOL BULLETINS containing articles on the Bahamas include: "New U. S. Defense Bases, the Bahamas and Jamaica," October 21, 1940; "Defense Bases Bring New Land under American Flag," October 7, 1940; and "Bahamian Sponge Industry Hard Hit by Fungus Disease," April 15, 1940.

Bulletin No. 2, November 17, 1941.



Photograph by Sands

THE BAHAMIAN SPONGE INDUSTRY CELEBRATES A HUNDREDTH ANNIVERSARY THIS YEAR

Although the chief sponging grounds in the Bahamas lie along the 200-mile Great Bahama Bank, Exuma Sound to the northeast of Great Exuma has also been the scene of sponge gathering on a smaller scale. Peering through the waterglass in his left hand, a typical sponge fisherman aims his long-handled hook at a patch of sponge on the bottom. When hooked, the sponge is alive; its dead skeleton, washed clean and dried, makes the sponge of commerce. The waterglass eliminates the surface glare from the water, and enables one to see the underwater growth. A shipwrecked Frenchman, M. Gustave Renouard, is credited with starting in 1841 the export of Bahamian sponges, shipping his pioneer cargo to Paris. A mysterious epidemic killing off the sponges has injured the industry for the past several years.

U. S. DEFENSE BASES SERIES

This is the twelfth of a series of bulletins on U. S. defense bases. Many of the other bulletins of the series are available at the Washington, D. C., headquarters of the National Geographic Society. Teachers whose subscriptions began after this series started, or who wish to replace copies missing from their files, may obtain the bulletins free of charge as long as the supply lasts.

GEOGRAPHIC SCHOOL BULLETIN

Published Weekly by

THE NATIONAL GEOGRAPHIC SOCIETY

(Founded in 1888 for the Increase and Diffusion of Geographic Knowledge)

General Headquarters, Washington, D. C.

World's Largest Steel Industry Supplies U. S.

THE United States, although feeling a shortage of steel, is now producing as much of the metal as the rest of the world combined. October's output brought the year's steel production to an all-time peak, and the 82 million tons expected by the end of 1941 will exceed by 25 per cent the previous record output of 1940.

A Connecticut Yankee ancestor of the slave-freeing John Brown is credited with making the first steel in the United States. Samuel Higley, of the Connecticut town of Simsbury, got a pound or two of iron from the local blacksmiths in June, 1725, and processed it into the continent's first recorded home-made steel.

American Revolution Gave the Industry Its Start

Since then, the American steel industry has become the largest in history, with about half of the world's output in 1940. In 1941 its production equaled that of all other nations together (whose plants have meanwhile been damaged by war).

This giant metal industry was a puny infant, slow in developing. Only five iron plants in the American colonies reported steel furnaces in 1750; the British prohibited any expansion. With the Revolution, however, the growth began.

The steel center of the young United States when the Constitution was drawn up was Philadelphia, where George Washington visited the steel furnace considered America's largest and best. By 1810 the country was producing only 917 tons of steel. Not until the 1820's did the American steel industry make as much as 1,600 tons a year, an amount equal to that imported from England, and begin to supply its own metal for plowshares, scythes, shovels, and saws.

Making steel, since its invention in the Orient before the dawn of history, has been a process of adding alloys to strengthen iron, which in its pure state is relatively soft. Steel from India was part of the booty of Alexander the Great, in the 4th century B.C., and the sword makers of Damascus built their reputation on Indian steel. Carbon alone was the magic ingredient that made iron into steel from the Biblical days of Job till 84 years ago. The carbon was customarily added by a rather haphazard procedure of heating iron in contact with charcoal, thus "blistering" the iron and making "blister steel" a few pounds at a time. So much British timber went up in smoke producing charcoal for this process that Queen Elizabeth restricted steel-making in her realm to save the forests.

Cannon-Makers and Amateur Chemists Helped Mass Production

A Kentuckian, William Kelly, worked out the principles of burning the impurities out of iron, and thus controlling the amount of alloys in steel, by blowing air through molten iron in the furnace. But the English inventor Henry Bessemer independently discovered the process while making cannon, and patented the Bessemer converter in 1855 (illustration, next page). He thereby provided a cheap method for the mass production of steel. The Martin brothers in France and the German-born Siemens brothers in England soon developed the open-hearth process, by which more than 90 per cent of United States steel now is made.

Chemical factors worked out in 1878 by a British police court clerk, Sidney Thomas, and his cousin Percy Gilchrist, made it possible to process steel from iron containing phosphorus, the type most abundant in the United States. Thereafter, use of the cheapest materials for quantity production ushered in the Age of Steel.

By 1939 the United States had made its billionth ton of steel. In 1940 the

UMI

In the peace conference that followed, their representatives sought an independent, autonomous status for Kurdistan. These efforts were unsuccessful, and an armed rebellion broke out in Turkey in 1925, which, however, was eventually put down.

The total number of Kurds is variously estimated at from one and a half million to three millions. In Iran there are fewer than in Turkey and Iraq; according to conservative count, the Iranian Kurds number probably not more than half a million.

In character, the Kurds have shown a curiously mixed disposition, with such qualities as hospitality, bravery, a sense of honor, and love of freedom, coupled with ruthlessness against the enemy and dislike for work. They are reputed to have great devotion for home and family, and the women enjoy more personal liberty than do women of other Mohammedan groups.

Note: For more information on the life of the Kurds and other peoples of the Bible Lands, see the following *National Geographic Magazine* articles: "On the Turks' Russian Frontier," September, 1941; "Bombs over Bible Lands," August, 1941; "Old and New in Persia," September, 1939; "Change Comes to Bible Lands," December, 1938; and "Kizilbash Clans of Kurdistan," October, 1928.

The Map of the Bible Lands published by the National Geographic Society as a supplement to the December, 1938, *Magazine* shows Kurdistan and its relation to other Near East regions. The map, which contains insets showing economic and historic development, as well as outlines of the travels of Biblical characters, is included in a folder describing maps and nature books published by the Society. This folder may be obtained from the Society's headquarters in Washington, D. C.

Bulletin No. 3. November 17, 1941.

Photograph by Melville Chater

THE KIZILBASH KURDS ARE A STRANGE SUBDIVISION OF A STRANGE RACE

This settlement of Kurds of the Kizilbash clan, in eastern Turkey, consists of a walled quadrangle of stone houses around a central court. A crude community fountain rises in the middle of the court, toward which the energetic housewife (center background) carries her empty water jar and kettle. Though many of the Kurds are Moslems and others are Zoroastrians in belief, the Kizilbash branch of the Kurdish family are Christians, and the women have consistently refused to veil their faces. Yet at night these people repair to their róof tops and salaam before the newly risen moon, preserving a pagan ritual perhaps handed down from pre-Christian days.

GEOGRAPHIC SCHOOL BULLETIN

Published Weekly by

THE NATIONAL GEOGRAPHIC SOCIETY

(Founded in 1888 for the Increase and Diffusion of Geographic Knowledge)

General Headquarters, Washington, D. C.

"Swamp's Afire!" Is the Cry in Great Dismal

MYSTERIOUS smoke from an unseen source rolled north across Virginia, into Maryland, across Delaware, into Pennsylvania, and filtered through the humid autumn air to be noticed as far north as New York at the close of October. Investigations showed that the earth itself was burning, in the 750-square-mile oval of "Virginia jungle" of Great Dismal Swamp, straddling the boundary between Virginia and North Carolina.

Leaves, branches, and rotting trunks of fallen trees, sinking through the still waters of the swamp for numberless centuries, have built up a layer of slowly drying peat about 12 feet thick in many places. A single spark or carelessly dropped match not only will ignite the dry tangle of vines on the surface, but will start a burrowing fire that burns down through the peaty earth to its clay foundation. A fire that started there in 1923 raged underground in the peat until March, 1926. Deep pits burnt out by peat fires become smoldering "fire-holes," then fill with swamp water and trap the man or beast that fails to see them.

George Washington Owned 4,000 Acres of Swamp

When surveying the boundary between Virginia and North Carolina in 1728, Col. William Byrd found the menacing swamp across his path and named it the Great Dismal, because "not even a turkey-buzzard will venture to fly over it."

But George Washington was less daunted by its ghostly quiet. He enlisted five friends to form with him the company of "Adventurers for Draining the Dismal Swamp" in 1763, bought some land within its borders, and himself surveyed a part of it. He paid at least six visits to this "glorious paradise" of marshy land. The 4,000 acres he still owned at his death were valued in his will at $20,000. A canal he started through the swamp still bears his name (illustration, next page).

A North Carolina governor on a hunting trip penetrated to the very center of Great Dismal and found a fresh-water lake three miles across. It is named Lake Drummond in his memory. Drummond, for daring to back Bacon's Rebellion against royal authority, was hanged in 1677, and started a series of gruesome traditions connected with the lake. Runaway slaves, "moonshiners," and Indians have figured in its folklore. The Irish poet, Thomas Moore, while staying at Norfolk, Virginia, visited the swamp and wrote "The Lake of the Dismal Swamp," a mournful ballad of a lovelorn man pursuing the phantom of his dead sweetheart to the treacherous shores of Lake Drummond. The American poet Longfellow also contributed a poem to the lore of the haunted swamp.

Much of Area Has Been Drained for Farming

The lake, spreading over the highest part of the Great Dismal, about 20 feet above sea level, drains outward in all directions. Since it has no inlets, scientists believe that it is filled by water seeping in from beneath.

The water of Lake Drummond, although perfectly fresh, is amber-colored, like a giant cup of tea, and has gained considerable renown as "juniper water." The color is acquired as the water percolates through the tangle of tree roots and fallen trunks, especially those of the "juniper" or southern cedar. Chemicals gained from the wood along with its amber tinge give the water its reputation for specal healthful value, as well as the unusual property of staying fresh long after other water has turned stale and brackish. Because of this lasting quality,

UMI

country's mills made enough to supply 1,010 pounds of new steel manufactures to each man, woman, and child in the land. Now the industry employs more than 600,000 workers in about 275 communities, scattered through 28 States, with the greatest concentration around Chicago and Pittsburgh.

The modern use of alloys in addition to the traditional carbon, beginning with manganese in 1857, can make steel with as many different "flavors" as cake, and different properties for each. For extra toughness, for a non-corroding surface, for hardness even at a red heat, or for any other required quality, the appropriate alloys can be chosen from the usual list of aluminum, manganese, chromium, cobalt, copper, molybdenum, nickel, tungsten, and vanadium. The alloy steel in greatest demand in 1940 contained 1.75 per cent nickel and 0.25 per cent molybdenum.

For defense, the nation depends on the steel industry for tanks, trucks, and artillery, battleships and armor plate, guns and ammunition, and the machines that manufacture them. Chief peacetime customer for steel is the automobile industry, taking more than one-sixth of the steel produced, to give the United States 71 per cent of the world's passenger cars. Structural steel for buildings and bridges is next in importance. Railroads take one-tenth of the output. Housewives of the nation gather another large fraction into their market baskets, as sheet steel in tin cans. Aviation is becoming a leading steel consumer, calling for five tons of steel each for some of the heavier bombing planes.

Bulletin No. 4, November 17, 1941.

Photograph courtesy Illinois Steel Company

FIREWORKS FLASH FROM THE BESSEMER "EGG" THAT HATCHED AN INDUSTRY

Steel was made by small-scale handicraft methods until Henry Bessemer in 1855 patented the process using this egg-shaped vessel called the Bessemer converter, which converts soft iron into hard steel. The converter has a large opening at the top and a number of openings at the bottom through which air can be blown in under pressure. The process—called a "blow"—of blowing the air through a converterful of iron lasts about ten minutes. The air injects oxygen into the molten iron and burns out impurities, which shoot out through the top, as shown here, in sparks and blinding flames of red, orange, or brown. These industrial fireworks are the most colorful display of steel-making, and among the most dangerous to workmen who may stand too near. From 10 to 30 tons may be produced at each "blow."

"juniper water" was in demand for use on sailing vessels with long voyages ahead.

Off the beaten paths, the greatest danger in Great Dismal Swamp is quicksand. More than a third of its original area has been drained and planted in beans, rye, oats, and cucumbers. But cotton grown in the peculiar soil is tinged with blue or muddy yellow.

Chief value of the Great Dismal has been its timber. Lumber companies own most of its area, and carry out rafts of hardwood logs on the half-dozen canals or short spurs of narrow-gauge railroads.

The Dismal Swamp Canal, dug through in 1828 by slaves, is still in use as a short cut to avoid the Atlantic dangers of rounding Cape Hatteras. Starting at its north locks at Deep Creek, Virginia, six miles southwest of Portsmouth, it runs for 22 miles through the swamp, paralleling the George Washington Highway.

Note: For more information on the Dismal Swamp, see the *National Geographic Magazine* articles: "Dismal Swamp in Legend and History," July, 1932; and "Travels of George Washington," January, 1932.

Bulletin No. 5, November 17, 1941.

Photograph by H. W. Gillen

PICNICKERS FIND DISMAL SWAMP LESS FORBIDDING THAN ITS NAME

While surveying a canal for transporting timber off the swamp property he owned, George Washington called the swamp a "glorious paradise." Here the canal named for him is shown where it unites with the Jericho Canal, or "Ditch." In the tangled forest of gum, cypress, and maple trees, visitors see wild grapes and pokeberries, and blackberry bushes 20 feet high. The black bears and raccoons frequenting the Great Dismal bring hunters every season.